

GRANULAR AGGREGATE RESOURCES OF
McDOUGALL LAKE (N.T.S. 21 G/7)

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McDOUGALL LAKE (N.T.S. 21 G/7)



Mineral Resources Division
Department of Natural Resources
New Brunswick

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RESUME

La présente étude a pour but premier de cartographier à l'échelle de 1:50,000 les dépôts meubles de sable et gravier dans la région correspondant au feuillet topographique 21 G/7 (McDougall Lake). La carte est accompagnée d'un rapport décrivant brièvement le contexte géologique, les méthodes de travail ainsi que les caractéristiques principales des différents types dépôt meubles. Une évaluation sommaire du potentiel économique de ces dépôts est présentée et une compilation des observations de terrain complète les cartes en fournissant de plus amples détails sur les principaux dépôts.

La presque totalité des réserves de sable et gravier se retrouvent à l'intérieur de deux types de dépôts glaciaires: les eskers et les complexes d'épandage fluvio-glaciaire. On évalue à environ 36 million m³ le volume des ressources disponibles de sable et gravier.

ABSTRACT

This report provides an evaluation of the distribution, extent, thickness and quality of surficial granular aggregate deposits in the McDougall Lake (21 G/7) map-area. Major units of granular aggregate were mapped in detail and some comments have been made on the origin of the deposits. The most important deposits were sampled for the purpose of quality testing; calculations of reserve volumes were made for the major aggregate sources.

The bulk of the reserves occur in ice-contact stratified deposits, especially esker systems, and in fluvio-glacial out-

wash complexes. Total recoverable reserves in the area are estimated at 86 million m³.

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INTRODUCTION

The Present Study

This report summarizes the results and findings of field investigations undertaken during the summer of 1982. The objective of this study was to provide basic information on the distribution, extent, thickness and quality characteristics of granular aggregate deposits in the McDougall Lake centered region. This information is directed to both producers and consumers of granular aggregates in their search for workable deposits, as well as land-use planners concerned with efficient resource utilization.

Location of the Study Area

The area under investigation covers approximately 1,110 km² and is situated in southwest New Brunswick. It is bounded by latitudes 45°30'/45°15' North and by longitudes 67°00'/66°30' West and covers the entire NTS map-sheet 21 G/7 (Figure 1).

Previous Geological Work

Most of the early work on the surficial geology of the area was done by Chalmers (1890). In 1973, Gadd published a regional study of the Quaternary geology of southwestern New Brunswick at a 1:250,000 scale. His work included the present map-area but emphasized the regional aspects of deglaciation. Szabo (1975) studied glacial dispersal patterns in the vicinity of the Mount Pleasant ore body.

The bedrock geology of the map-area has been investigated mainly by Ruitenberg (1963, 1976a, b, 1978), Harris (1964) and Gemmell (1975). Several other individuals have studied parts of

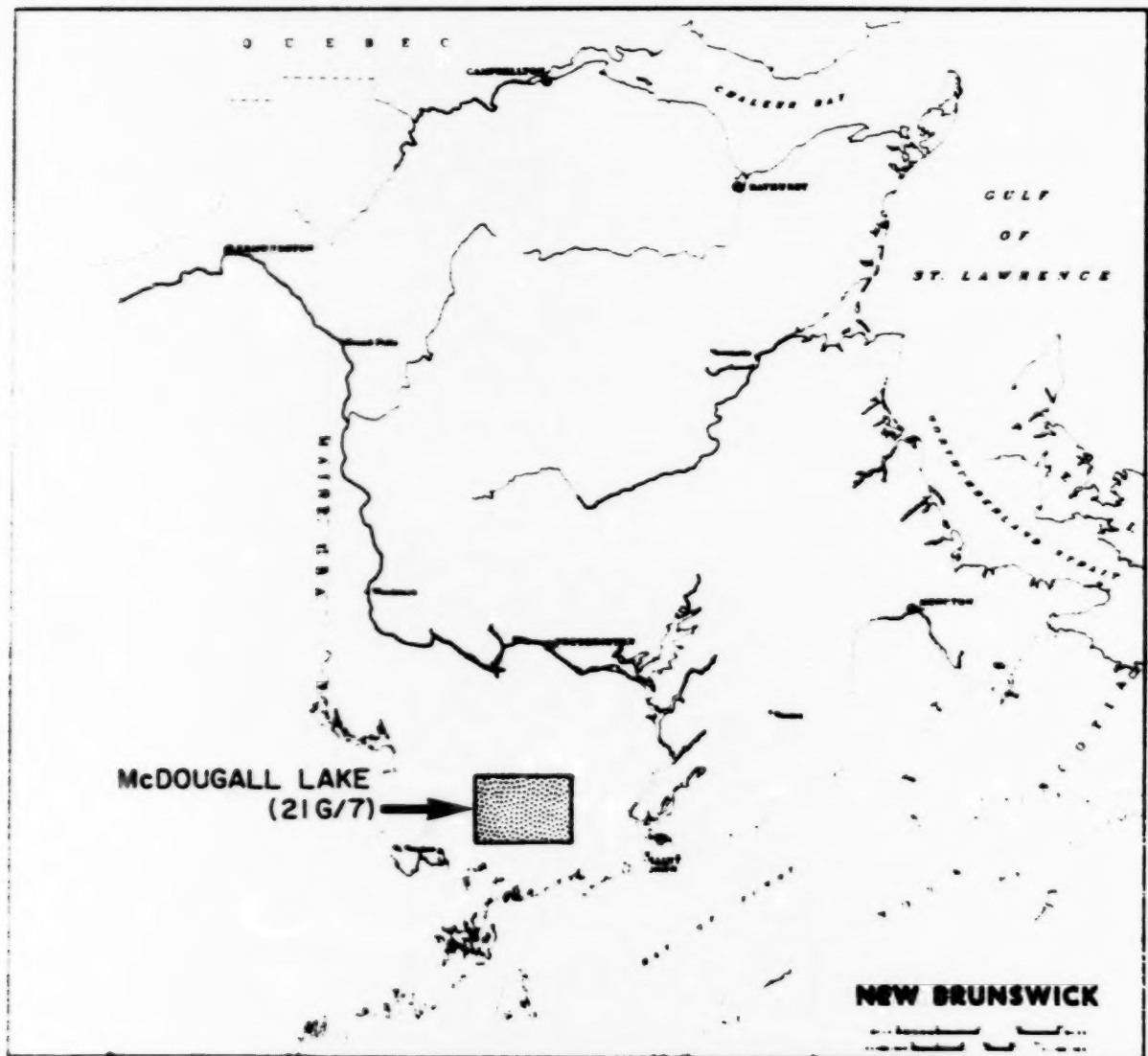


Figure 1: Map showing location of study area.

the area and published maps at various scales. These maps and reports are referenced in the Mineral Resources Branch, List of Publications (Carroll, 1977).

Finamore (1977) examined the granular aggregate deposits south of McDougall Lake. The study area is included in a soil survey of southwestern New Brunswick (Wicklund and Langmaid, 1953).

PHYSIOGRAPHY

The area is located within the St. Croix Highlands, a physiographic subdivision of the New Brunswick Highlands. The New Brunswick Highlands are U-shaped with the western arm covering much of the central part of the province and the eastern arm, the St. Croix Highlands, bordering the Bay of Fundy (King, 1972).

The landscape is one of contrasts. Rounded hills of volcanic and intrusive rocks to the north and east rise up to 370 m AMSL and overlook the low lying McDougall Lake basin to the southwest. Glacial scouring has shaped the landscape west of the Magaguadavic River into a series of parallel, southeasterly oriented ridges and troughs.

Modern drainage of the map-area in a large part reflects ice-controlled late-glacial drainage (Gadd, 1973) and streams are still in a youthful stage of evolution: channels are irregular, often underfit and rapids are common. Drift accumulations still block or impede drainage in the valleys and low lying areas, resulting in numerous lakes, peat bogs, and wetlands. Except for the South Oromocto Lake watershed basin which drains northward to the Saint John River, all the other waterways drain towards the

Bay of Fundy, principally via the Magaguadavic and the Lepreau Rivers.

GEOLOGY

Bedrock

The bedrock geology is given in Figure 2 which shows the distribution and age relationship of the major groups of rocks.

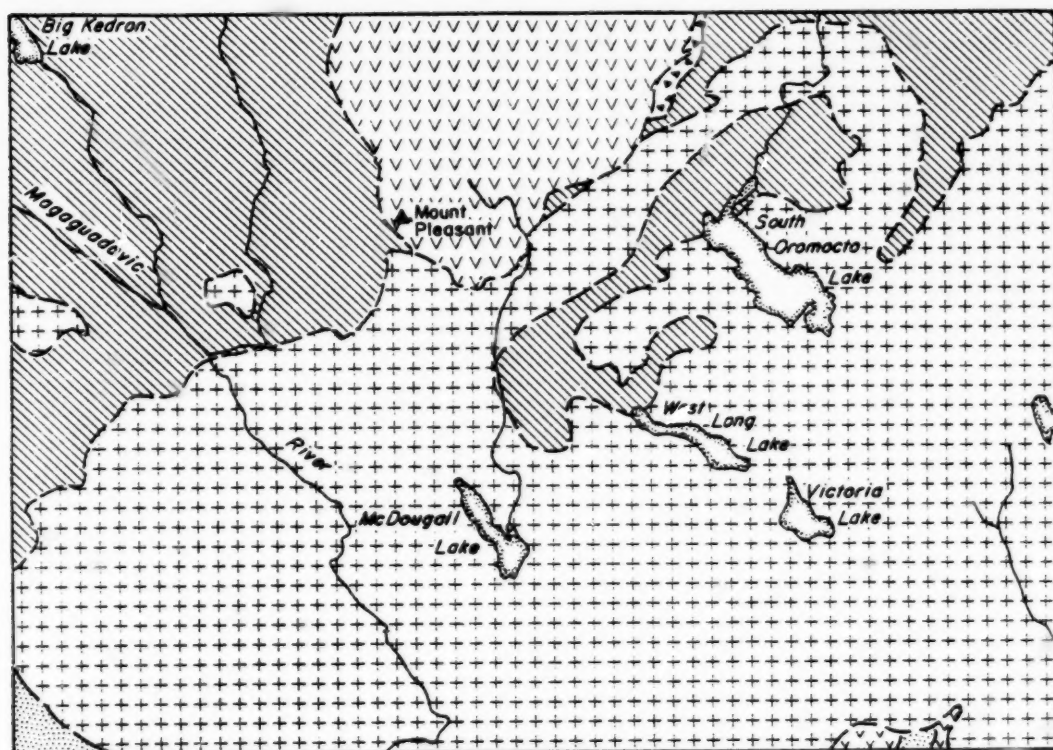
The oldest rocks are of Silurian to Lower Devonian age and consist of sandstone, greywacke and slate that have been deformed and subjected to low grade metamorphism. These rocks have been intruded by granitic rocks of Devonian to Lower Carboniferous age. The igneous intrusive rocks belong to the large St. George Pluton and form the principal bedrock unit of the map-area. Volcanic activity during Mississippian time resulted in the Mount Pleasant Caldera and its associated suite of eruptive and intrusive rocks.

Surficial

The sequence of glacial events occurring prior to Late Wisconsinan time is not known since no evidence has been found which can be definitely assigned to an earlier age.

Gadd (1973) summarized the sequence of events that eventually led to the deglaciation of southwestern New Brunswick, including the present study area.

The two principal ice flow directions noted by Gadd (1973) were also observed in the McDougall Lake map-area. In the western part, the main flow was southeasterly, as evidenced by striations and streamlined features; in the eastern part, the flow was southerly. According to Gadd (1973), these two directions represent



MISSISSIPPIAN



Mainly silicic volcanic flows, tuffs and related intrusive rocks



Argillite breccia: part tuffaceous, minor red beds near top

DEVONIAN to LOWER CARBONIFEROUS



Granite, quartz monzonite, granodiorite and related rocks



Gabbro, diabase, diorite

SILURIAN to LOWER DEVONIAN



Greywacke and slate; sandstone and conglomerate



Interbedded mafic and silicic volcanic rocks, gabbroic sills and dykes



Geological boundary

SCALE 1:250,000

0 5 10
Kilometres

Figure 2: Bedrock geology modified after Potter et. al. (1979)

late-glacial lobation of the ice with two broad lobes converging along a line between Fredericton and Pennfield.

During the initial phase of ice margin retreat, very large quantities of glaciofluvial sediments were deposited in a reentrant between the two lobes, just south of the map-area, at Pennfield. Following the formation of the Pennfield outwash plain, the ice margin retreated northward and eventually stood in the vicinity of McDougall Lake where a broad belt of morainic accumulations was emplaced and large volumes of glaciofluvial outwash were deposited. Significant ice-marginal changes also happened. As the ice thinned on the uplands, the South Oromocto Lake/Victoria Lake esker system was abandoned and meltwaters started draining northeastward into the Douglas River system near Wirral, just off the northeastern corner of the map-area. The ice then disappeared from the highlands but was probably still present in the northwest part of the map-area, in the Kedron Lakes/Oromocto Lake basins (Gadd, 1973). The opening of the Saint John River valley marked the end of active ice in the general area.

Deglaciation was closely followed by marine inundation of the coastal zone, possibly up to the 60 m contour line in the McDougall Lake map-area. Later, as emergence proceeded, much channelization took place upon the drift-covered landscape of the McDougall Lake basin before present-day river courses were established. Paludification followed abandonment of channels and bog development took place in poorly drained basins.

GRANULAR AGGREGATE RESOURCES

Field and Laboratory Methods

Information used in the determination of deposit boundaries and thicknesses was obtained by the examination of gravel pit faces and all other natural and man-made exposures that were encountered. Several exposures were made or improved by the use of shovels and hand-augering equipment.

Samples of granular materials were collected from available exposures with a sample site distribution designed to provide a reliable assessment of material qualities in the major deposits. Care was taken to obtain samples that were as representative as possible. All samples were subjected to wet-sieve analysis to accurately determine the proportion of fine particles (less than 75µm). Supplementary data obtained from the Department of Transportation (D.O.T.) were included in the Appendix. It includes subsurface data obtained from augering operations and laboratory results of various tests performed on the granular aggregate material.

The average material depths used for volume calculations were arrived at by projecting the depths observed in pit excavations to areas beyond the pit boundaries, with the aid of geologic and topographic observations on the ground and from a study of the aerial photographs. Confidence in reserve figures is affected by the reliability of material thickness data and of deposit boundaries. In no case can reserve figures be absolutely definitive. Traditional exploration methods, including detailed test-pitting or drilling with power equipment, are always required for

accurate evaluation of reserves.

Quality Limitations

The potential of many local granular aggregate deposits for use as high specification aggregate is limited by three major factors:

1) Fine particles: A high content of fine particulate matter (finer than 75 μ m) renders the material unsuitable for many uses, at least in the pit-run state. Washing can adequately lower the fine content but doing so increases the cost of exploitation.

Ablation till and some ice-contact deposits are specially affected by this condition.

2) Clast lithotypes: High specification coarse aggregate should consist of hard, strong, uncoated, durable particles of crushed stone or gravel. Certain lithotypes are in general more resistant to breakdown than others. The lithologic analyses recorded in Appendix A divide the lithologic components into two groups according to whether they are regarded as being sound or unsound. The test is qualitative, being based on the determination of the lithotype of each clast in the sample and on its resistance to disintegration under impact. This test should not be confused with quantitative soundness tests employing sodium or magnesium sulfate (C 88-73, A.S.T.M., 1974).

In general, the quality of the gravel found in the map - area is good to excellent.

3) Alkali-reactivity: Fine aggregate for use in concrete that will be subject to frequent wetting, extended exposure to humid atmosphere, or in contact with moist ground should be free

of reactivity with alkalis in cement which may produce excessive expansion in, or cause deterioration of, the concrete. Cox (1980) and Haines (1974) have documented alkali-aggregate reactions in New Brunswick concrete.

Sources of Granular Aggregate

Three basic types of granular aggregate deposits occur in the study area: (1) ice-contact stratified drift; (2) glaciofluvial outwash; and (3) ablation till. Detailed information on individual deposits can be found in Appendices A and B. Appendix A includes summaries of test results and is designed to complement the granular aggregate resources map (Plate 83-30). Figure 3 shows the location and 1982 status of sand and gravel pits located in the map-area.

1) Ice-contact stratified drift: Ice-contact sand and gravel deposits account for about 70% of the total volume of granular aggregate found in the map-area (58 million m³).

These sediments were deposited in direct contact with, or in close proximity to the ice margin. The deposits characteristically comprise well to poorly stratified sand and gravel that may include varying amounts of silt and clay. The probability of locating granular aggregates is high though the quality may be unpredictable.

Sharp textural differences between adjacent beds of sedimented material are common. These deposits also very often exhibit deformation structures and may contain till inclusions. As such, they reflect the highly fluctuating hydrologic conditions and physical environment which exist in proximity of a melting glacier. The principal landform of this type found in the map-area is the esker.

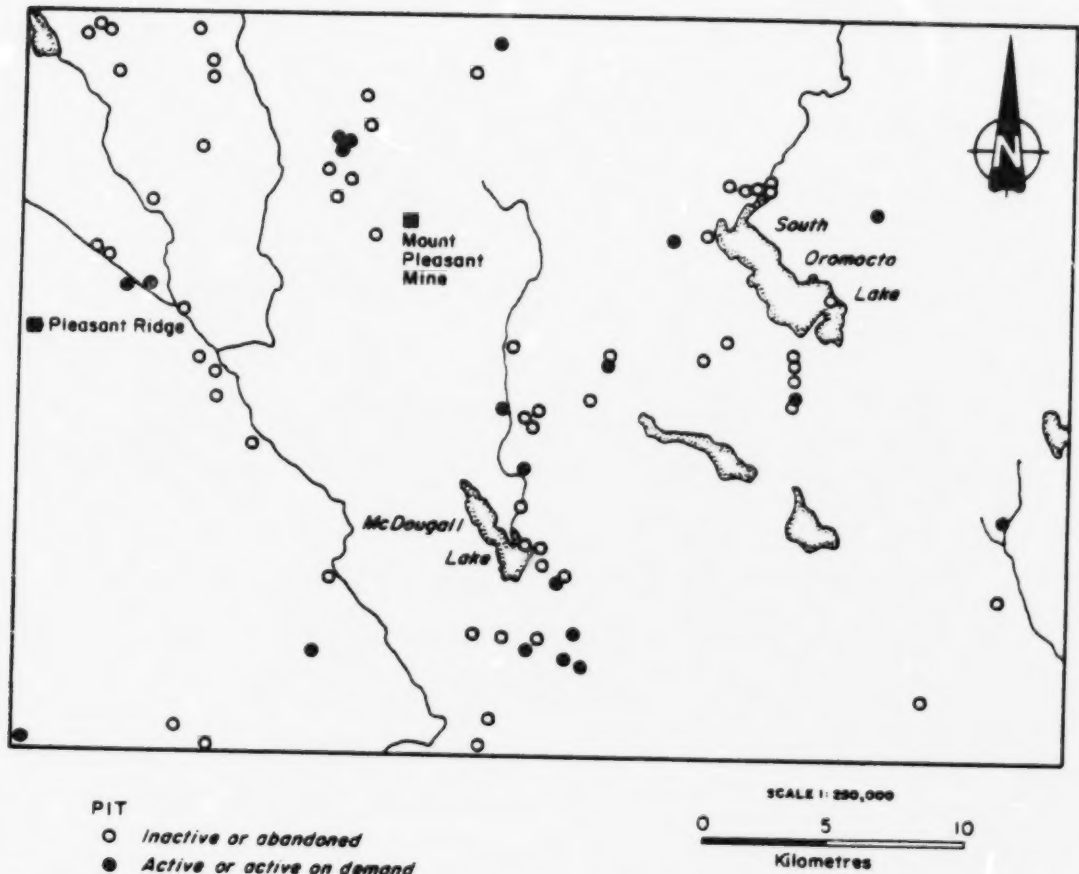


Figure 3: Status of sand and gravel pits in 1982.

Eskers are sinuous, narrow, elongated ice-contact ridges composed of stratified materials originally deposited in fractures or sub-glacial tunnels by flowing water.

Two main esker systems cross the area: (1) the South-Oromocto Lake/Victoria Lake esker (20 km long) and the (2) the Magaguadavic River/McDougall Lake esker (30 km long). Both systems are discontinuous along their length and are commonly surrounded by ice stagnation related deposits.

2) Glaciofluvial outwash: Outwash deposits in the form of channel fills and outwash plains account for about 30% of the total volume of granular aggregate found in the map-area (28 million m³).

Well developed outwash deposits have predominantly horizontal bedding and are generally texturally uniform. Proximal (deposited near ice) portions of outwash deposits may have ice-contact features. The probability of locating granular aggregates in these deposits is moderate to high.

The main accumulations of glaciofluvial outwash were deposited near the southern extremity of McDougall Lake, and in the vicinity of Pomeroy. Other outwash deposits are less extensive and shallower.

3) Ablation till: As a glacier melts, material carried within and atop, slides, flows, is dumped, or subsides onto the ground. The resulting accumulations of loose non-compact and non-fissile material is termed "ablation till". For the purpose of resource mapping, only the areas where significant accumulations of that material existed were mapped. Reserve calculations were not attempted but large and substantial volumes of material are present in three major moraines:

(1) surrounding Little McDougall Lake; (2) between the Magaguadavic River and Little Long Lake; and (3) at the southern extremity of

McDougall Lake.

The material is considered to be low-grade, suitable for use as borrow or subbase, but unsuitable for any high-specification use in its pit-run state. Beneficiation of such deposits by crushing and washing procedures is a definite possibility although at present this may not be economical or necessary.

4) Minor deposit types: Alluvial deposits occur along most rivers and streams but generally do not contain significant accumulations of sand and gravel. Only the more extensive alluvial terraces along the Magaguadavic have been mapped. The composition of the alluvium will generally be sand with some silt.

Small meltwater and ancient alluvial channels presently occupied by underfit streams or marshes are common in the McDougall Lake basin ("arrow" symbol on map). These abandoned drainage ways were formed by water flowing off the margin of the melting glaciers and by early streams that followed the retreat of marine waters. Deposits within the channels are generally shallow compared to the major deposits previously described.

Marine wave-reworked glacial deposits may be present below the 60 m elevation.

Boulder pavements have been noted in the northeast part of the map-area. These are thought to represent periglacial activity following the disappearance of the glaciers.

CONCLUSIONS

Recoverable reserves of granular aggregate material in the study area are estimated at 86 million m³. Ice-contact deposits account for 70% of the estimate and glaciofluvial outwash deposits for 30%.

Reserve estimates do not completely account for the sterilizing effect of various physical, cultural or economic restrictions which limit or restrict access to these reserves.

Some deposits that were too small to be considered a reserve were not included in the total estimate but may represent valuable resource deposits for local construction and road improvement activity. These small deposits will naturally assume a more important role based upon their proximity to end use. Large accumulations of ablation till were not included in the total reserve figures because of the low grade nature of these deposits. They do, however, represent a good potential source of abundant low grade fill.

REFERENCES

- A.S.T.M. 1974. Concrete and Mineral aggregates (including manual of concrete testing). American Society for Testing and Materials, Annual Book of ASTM Standards, Part 14, p. 49 - 53.
- CARROLL, D.J.J. 1977. List of publications available from Mineral Resources Branch. New Brunswick Department of Natural Resources, Mineral Resources Branch, Information Circular 76-1.
- CHALMERS, R. 1980. Report on the surface geology of southern New Brunswick. Geological and Natural History Survey of Canada, Annual Report, Volume IV (1888-1889), Part N, 51 p.
- COX, P.E. 1980. Alkali-aggregate reactions in southern New Brunswick concrete. University of New Brunswick, Fredericton, New Brunswick, B. Sc. thesis (unpublished).
- GADD, N.R. 1973. Quaternary geology of southwest New Brunswick with particular reference to Fredericton area. Geological Survey of Canada, Paper 71-34, 31 p.
- GEMMELL, D.E. 1975. Carboniferous volcanic and sedimentary rocks of the Mount Pleasant Caldera and Hoyt appendage New Brunswick. University of New Brunswick, Fredericton, New Brunswick, M. Sc. thesis (unpublished).
- HAINES, G.H. 1974. The alkali expansivity of concrete aggregates in New Brunswick. University of New Brunswick, Fredericton, New Brunswick, B. Sc. thesis (unpublished).
- HARRIS, F.R. 1964. Volcanic rocks of the Sunday Lake area, New Brunswick. University of New Brunswick, Fredericton, New Brunswick, M. Sc. thesis (unpublished).
- KING, L.H. 1972. Physiographic evolution of the Canadian Appalachian Province. In Variations in tectonic styles in Canada, Price, R.A. and Douglas, R.J.W. (editors), pp. 248-253.
- POTTER, R.R., HAMILTON, J.B., and DAVIES, J.L. 1979. Geological map of New Brunswick. New Brunswick Department of Natural Resources, Map N.R. -1, scale 1:500,000, Second edition.
- RUITENBERG, A.A. 1963. Tin mineralization and associated rock alteration at Mount Pleasant, Charlotte County, New Brunswick. University of New Brunswick, Fredericton, New Brunswick, M. Sc. thesis (unpublished).
- RUITENBERG, A.A. 1967a. Geology of the St. Stephen-Pleasant Mountain area, New Brunswick. Geological Survey of Canada, Map 20-1966, scale 1:63,360.
- RUITENBERG, A.A. 1967b. Stratigraphy, structure and metallization, Piskahagan-Rolling Dam area (Northern Appalachians, New Brunswick, Canada). Leidse Geologische Mededelingen, Volume 40, pp. 79-120.

SZABO, N.L. 1975. Dispersion of indicators by glacial transportation at Mount Pleasant. University of New Brunswick, Fredericton, New Brunswick, Ph. D. thesis (unpublished).

WICKLUND, R.E. and LANGMAID, K.K. 1953. Soil survey of southwestern New Brunswick. New Brunswick Soil Survey, Report No. 4.

APPENDIX A

SAMPLE DESCRIPTIONS
OF
MCDOUGALL LAKE MAP-AREA
21 G/7

LOCATION #: G7-1

- 17 -

NTS: 21 G/7

Type of Deposit: Ablation till

County: Charlotte

Exposure Type: Pit

Parish: Dumbarton

Status: Abandoned

UTM: 584 396

SECTION DESCRIPTION & COMMENTS:

This pit, developed in a moraine deposit, is now abandoned and largely overgrown. The immaturity of the deposit is demonstrated by the abundance of poor lithotypes, mainly of local origin, and also by the angularity of the rock fragments.

The maximum section height is 6 m and the sample was obtained at 2 m below the top of the section. Overlain by about 0.5 m of soil cover, the material is moderately loose and consists of cobbly pebbly sand with clasts of 20 cm diameter common. Large granite erratics occur commonly at the surface of the deposit, with some boulders measuring up to 1 m in diameter.

North and northwest of this locality, the landscape is hummocky and more material of similar grade and texture can be expected in the general area.

MECHANICAL ANALYSIS:

sieve	31.5mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	93.6	91.1	88.1	73.2	61.1	50.6	41.6	32.9	24.1	16.0	9.0

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 69 %

Sandstone 31; Slate and Shale 29;
Weathered 9

Sound Lithotypes 31 %

Quartzite 12; Sandstone 6;
Metasediment 4; Felsic intrusive 3;
Quartz 3; Felsic volcanic 2; Mafic
volcanic 1

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
			Moderate and/of local importance only

LOCATION #: G7-2

- 18 -

NTS: 21 G/7

Type of Deposit: Ablation till

County: Charlotte

Exposure Type: Pit

Parish: Dumbarton

Status: Inactive

UTM: 593 396

SECTION DESCRIPTION & COMMENTS:

1.0 m Ablation Till: Moderately loose, cobbly, pebbly sand till. Boulders at top of section include some large (40-50 cm) quartz feldspar porphyry rock types. Granite, Flume Ridge sandstone, Pennsylvanian conglomerate and vesicular basalt erratics were also observed.

0.4 m Basal Till: Compact, slightly silty, pebbly sand till.

1.5 m Slump Covered: Assumed to be basal till.

This small borrow pit has been used locally for lumber road improvement. More material of similar grade and texture can be expected in the general area.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	88.2	86.2	77.7	73.3	66.0	57.8	49.5	41.9	34.6	26.8

LITHOLOGIC ANALYSIS: N.A.

Unsound Lithotypes

Sound Lithotypes

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
			Moderate and of local importance only

LOCATION #: G7-3

NTS: 21 G/7

Type of Deposit: Ablation till

County: Charlotte

Exposure Type: Pit

Parish: Dumbarton

Status: Abandoned

UTM: 597 380

SECTION DESCRIPTION & COMMENTS:

0.6 m Overburden: Loose and oxidized soil horizon.

1.0 m Ablation Till: Moderately sorted, pebbly sand till with minor amounts of silt. Cobbly with some boulders at the top of the section, progressively finer downwards to a pebbly sand. Moderately loose structure; rounded to sub-angular pebbles. The sample was obtained from the base of the section and is representative.

1.0 m Slump Covered: Assumed to be as above.

The material is suitable for fill and low grade usage. Water remained at the base of the pit throughout the summer season suggesting the presence of an impervious horizon at shallow depth (probably basal till).

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	96.9	94.7	84.6	75.3	64.4	54.0	42.9	32.3	24.3	18.0

LITHOLOGIC ANALYSIS: N.A.

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
			Moderate and of local importance only

LOCATION #:	G7-4	NTS:	21 G/7
Type of Deposit:	Ablation till	County:	Charlotte
Exposure Type:	Pits	Parish:	Dumbarton
Status:	Inactive	UTM:	613 334

SECTION DESCRIPTION & COMMENTS:

Two small roadside pits expose material with a texture characteristic of fluvial deposits. The moderately well sorted, loose, pebbly sand was probably deposited as glaciofluvial outwash in the Kedron Stream valley when glacial ice in the Oromocto basin was melting. The outwash in the Kedron Stream valley is expected to be patchy, discontinuous and limited in extent.

MECHANICAL ANALYSIS:

sieve	31.5mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	83.5	79.1	74.4	66.0	56.6	45.3	36.6	28.2	20.6	15.0	10.6

LITHOLOGIC ANALYSIS: N.A.

<u>Unsound Lithotypes</u>	%	<u>Sound Lithotypes</u>	%
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ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
			Patchy and of limited extent.

LOCATION #: G7-5

- 21 -

NTS: 21 G/7

Type of Deposit: Outwash

County: Charlotte

Exposure Type: Pit

Parish: Dumbarton

Status: Active on demand

UTM: 615 300

SECTION DESCRIPTION & COMMENTS:

0.5 m Overburden: Oxidized zone; soil horizon.

3.5 m Sand and Gravel: Well stratified, moderately sorted sand and gravelly sand. The clast size does not exceed 20 cm and the coarse gravel fraction generally averages 5 to 10 cm in diameter. Some of the thick sand beds show cross-stratification. Clasts are subrounded to rounded and a significant percentage of soft redbed sandstone and siltstone pebbles was noted. The sample A was obtained from a finer-textured horizon within this unit and is not representative.

3.0 m Sand: Well-sorted and well-bedded, reddish hued, medium to fine sand. Reddish colour is caused by small grains of red siltstone. Sharp erosional contact with the upper unit. Bedding dips southwest.

The upper gravelly horizon has moderately good crushing potential; the limiting factor is the relatively high percentage of unsound soft lithotypes. A small proportion of clasts are manganese-stained.

MECHANICAL ANALYSIS:

(CONTINUED)

sieve	31.5mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
a	97.3	92.9	89.0	80.5	72.6	65.1	37.7	22.9	7.4	3.8	2.7
% passing											
b				100.0	99.2	98.4	94.6	50.9	9.4	3.6	1.1

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 61 %

Sandstone 48; Weathered 15

Sound Lithotypes 37 %

Felsic intrusive 15; Quartzite 8;
Sandstone 7; Quartz 2; Mafic intrusive
2; Metasediment 2; Mafic volcanic 1

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
160	60	5	3 million

LOCATION #: G7-5

- 22 -
(cont'd)

In 1982, a permit was issued to D.O.T. to remove up to 20,000 tonnes of gravel for highway construction.

This glaciofluvial deposit is probably the result of accumulation of outwash sediments at the mouth of the Kedron Stream, at a time when, because of drift-damming of the Magaguadavic valley southeast of Pomeroy, the water level in the valley was higher. The outwash sediments partially bury an esker system. Kettles on the surface of the deposit indicate that glacial ice was nearby at the time of its formation. Channeling of the deposit suggests vigorous erosive and downcutting activity by the proto-Magaguadavic River, following the erosion of the drift dams downstream.

Large volumes of material are available, however, texture may be erratic and not as well sorted particularly if excavations encounter the buried esker.

LOCATION #: G7-6A, B, C, D

- 23 -

NTS: 21 G/7

Type of Deposit: Ice-contact

County: Charlotte

Exposure Type: Pits

Parish: St. George

Status: Active on Demand

UTM: A = 685 353

B = 687 356

C = 686 357

D = 689 374

SECTION DESCRIPTION & COMMENTS:

A series of small pits in the same general area are grouped under G7-6. All are developed within a kame and kettle, ice disintegration complex. All exhibit glaciofluvial character in section and are commonly overlain by till.

(A) All faces in this pit were slumped. Stockpiles of pit-run material remained on site. Sections displayed 2 to 4 m of fine-textured material. Fine sand dominates; in places, the material is silty. Some coarse, sub-angular, cobbly gravel was also observed. The largest clast, a granite boulder, measured 1 m in diameter. The silt and fine sand have a common reddish hue. Slumped strata were noted.

(B) This is a relatively small and shallow pit, with maximum section heights of 3 m. The pit has been developed in a small kame. Material is coarser than at locality (a), but is still dominantly fine-textured. Faces expose stratified medium to coarse sand and pebbly sand. Clast size is rarely larger than 4 cm. Sample (a) is representative of the material found on the site.

(C) A small pit has been opened in a small ice-contact hill (kame). Although the material is generally fine-textured, beds of pebble gravel are observed. Sample (b) is representative of the coarser material found in the pit. Some rhythmically

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
a	97.7	95.2	84.3	70.2	54.0	37.2	22.5	10.4	4.2	2.4
b	100.0	98.9	87.6	58.9	36.2	24.5	17.6	11.4	7.5	5.6

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 39 %

Sandstone 38; Chert 1

Sound Lithotypes 61 %

Felsic intrusive 22; Quartzite 18;
Sandstone 13; Felsic volcanic 7;
Quartz 1

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
350	200	2.5	5 million

LOCATION #: G7-6A, B, C, D

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(cont'd)

bedded silt and fine sand units were noted. Contorted bedding suggests deposition in an ice proximal environment. Boulders are absent and few clasts are larger than 4 cm.

(D) Stratified sand and pebbly sand are exposed in another small pit opened in a low, subdued ice-contact mound. Face height averaged 2 m.

Although the reserves estimate indicates that large volumes of material are present several factors minimize the usefulness of the deposit. These include: the generally poor drainage due to the mound-and-kettle topography; the common presence of till at the surface which "hide" the glaciofluvial accumulations; the variability of textural grades; and the erratic nature of the individual deposits.

LOCATION #:	G7-7	NTS:	21 G/7
Type of Deposit:	Ablation till	County:	Charlotte
Exposure Type:	Pit	Parish:	Clarendon
Status:	Active on demand	UTM:	739 399

SECTION DESCRIPTION & COMMENTS:

0.2 m Overburden: Coarse-textured soil horizon developed in ablation till.

0.4 m Ablation Till: Cobbly, coarse pebbly sandy ablation till, moderately loose and very poorly sorted. Clasts are angular to subrounded.

0.8 m Sand and Gravel: Poorly stratified and poorly sorted, loose, pebbly gravel and sand with some cobbles.

0.2 m Till: Reddish-brown, compact, pebbly silty sand till.

0.4 m Slump Covered: Assumed to be till.

The texture of the material is very variable but generally coarse. Several other similar deposits occur in the area. They are restricted to a zone of ablation till occupying the Piskahegan Stream and the McDougall Inlet valleys. Only the major areas of accumulation have been delineated (see map in pocket). In general, usage of these deposits is limited to local needs for lumber road fill material.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	98.0	95.2	85.0	70.5	52.4	40.2	30.-	20.4	12.8	8.3

LITHOLOGIC ANALYSIS: N.A.

Unsound Lithotypes	%	Sound Lithotypes	%

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
			Substantial but low grade.

LOCATION #: G7-8

- 26 -

NTS: 21 G/7

Type of Deposit: Ice-contact

County: Charlotte

Exposure Type: Pit

Parish: Clarendon

Status: Active on Demand

UTM: 807 324

SECTION DESCRIPTION & COMMENTS:

A small pit has been opened in the Wildcat Brook esker. At the time of visit, all faces were slumped and the maximum section height was 3 m. The material consists of moderately sorted, stratified sand and gravel. The largest clast size noted was 20 cm; in general, the coarse aggregate is of pebble size. Clasts are moderately rounded and the proportion of hard volcanic clasts is high. This is a fine-textured sand and gravel deposit.

The material has been used locally during construction of the small bridge over Perley Brook.

The esker is discontinuous and of low relief. It crosses a broad zone of ablation till, marked by morainic hills and ridges, and a coarse bouldery landscape. This hummocky relief is best expressed in the vicinity of Little McDougall Lake.

Reserves of aggregate in the esker are of limited extent but the gravel is of good quality and contains a high proportion of hard lithotypes. The morainic deposit offers significant volumes of lower grade, texturally variable material.

MECHANICAL ANALYSIS:

sieve	31.5mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	97.1	94.2	88.6	65.0	40.7	24.4	18.1	11.0	3.0	1.3	0.9

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 31 %

Sandstone 21; Weathered 7; Conglomerate 2; Shale and Slate 1

Sound Lithotypes 69 %

Felsic volcanic 52; Greywacke 5; Felsic intrusive 4; Mafic volcanic 4; Quartzite 3; Quartz 1

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
5	3	3	90,000

LOCATION #: G7-9

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NTS: 21 G/7

Type of Deposit: Ice-contact

County: Charlotte

Exposure Type: Road cut

Parish: Clarendon

Status: Undeveloped

UTM: 818 297

SECTION DESCRIPTION & COMMENTS:

The road cuts across a small esker that trends at 160° . The section along the road exposes 1.5 m of moderately sorted sand and gravel. The maximum clast size in section was 20 cm in diameter but the average clast size is about 5cm. There is a high proportion of hard rock types in the coarse aggregate fraction. The crushing potential is good. Because of the coarseness of the material, and the limitations of the sampling method, Sample A is not representative of the deposit as a whole.

The deposit consists of a complex of ice-contact stratified sediments and of morainic accumulations (where the material is more angular and more poorly sorted). The area has recently been cut over but exposures are few and no pits have been developed yet. From roadcut observations, the esker ridges offer good potential for high quality aggregate, mainly because of the low proportion of fines and because of the high percentage of resistant lithotypes. Reserves are significant but conservatively evaluated.

Although some of the eskers possess sufficient relief to be visible on aerial photographs (5-10 m), they commonly are more subdued features (2-3 m) that are only identifiable from the ground. More detailed field work is needed to accurately evaluate this complex.

In intervening areas between the ridges, the ground is even surface and mantled by a bouldery ablation moraine. Boulders are principally granitic.

MECHANICAL ANALYSIS:

sieve	31.5mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	93.5	87.0	81.8	66.5	55.0	42.6	32.0	21.8	11.8	7.6	6.3

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 25 %

Sandstone 18; Weathered 5

Sound Lithotypes 77 %

Felsic intrusive 35; Felsic volcanic 28; Greywacke 7; Mafic volcanic 4; Quartzite 2; Quartz 1

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
60	35	3	1 million

LOCATION #: G7-10

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NTS: 21 G/7

Type of Deposit: Ice-contact

County: Charlotte

Exposure Type: Pit

Parish: Clarendon

Status: Active on demand

UTM: 983 340

SECTION DESCRIPTION & COMMENTS:

CORE OF THE DEPOSIT:

0.3 m Overburden: Soil horizon.

1.5 m Sand and Gravel: Well-bedded, moderately well sorted, silt-free pebble gravel and sand. Clasts are generally rounded and there is a high percentage of volcanic clasts. The maximum clast size observed in section measured 30 cm in diameter, but in general, the material is of pebble size.

4.5 m Slump Covered: Assumed to be as above.

FLANK SECTION:

3.0 m Sand: Cross-bedded, well sorted sand with occasional thin beds of fine pebble gravel.

3.0 m Slump Covered: Assumed to be as above.

MECHANICAL ANALYSIS:

(CONTINUED)

sieve	31.5mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing ^a	97.3	96.4	90.1	74.2	57.1	32.2	18.2	9.7	2.3	1.5	1.1
b			100.0	98.0	88.3	72.7	36.2	9.0	2.1	0.8	0.4

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 60 %

Sandstone 50; Weathered 10

Sound Lithotypes 40 %

Felsic volcanic 17; Quartzite 6;
Felsic intrusive 5; Metasediment 5;
Quartz 4; Greywacke 3

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
330	200	3	6 million

LOCATION #: G7-10

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(cont'd)

The maximum height observed in the pit was 6.5 m. The core of the esker ridge is coarse and has good crushing potential. The flanking beds consist of fine-textured material, mainly sand.

Sample (a) was obtained from the core. Sample (b) comes from the flank of the deposit. Both samples are representative.

Reserve figures apply to the portion of the ice-contact system that extends northward from Deer Point. Because of the lack of exposures, the recoverable reserves estimate should be interpreted as a conservative evaluation of the volume of material present.

Glaciofluvial deltaic gravels may be present in the vicinity of Deer Point as deduced from study of aerial photographs and based on current interpretation of the deglaciation history of the area.

LOCATION #: G7-11

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NTS: 21 G/7

Type of Deposit: Ice-contact

County: Charlotte

Exposure Type: Pit

Parish: Clarendon

Status: Abandoned

UTM: 867 305

SECTION DESCRIPTION & COMMENTS:

0.6 m Overburden: Reddish brown, fine silty sand loam.0.6 m Sand: Well sorted medium sand with a 10 cm bed of reddish fine silty sand. The sample was obtained from this horizon.1.8 m Slump Covered: Assumed to be mainly sand.

Exposures along the lake suggest the presence of coarser material at the core of the deposit. Lithotypes point to a northern source for the sediments.

This small pit has been opened within the very extensive South Oromocto Lake esker system. Reserves for the northern portion of the system have been recorded on datasheet G7-10 and include a probable kame delta that is not well exposed in the field but inferred mainly from aerial photographs. Large boulder erratics occur commonly at the surface. Where exposed in roadcuts or during hand-augering, the material observed is generally sand. Red clayey silt has been observed about 1 km northeast of G7-11. Fine glaciolacustrine sediments are expected in the area.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing					100.00	98.3	63.9	17.7	3.4	1.2

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 44%

Sandstone 36; Shale and Slate 5;
Weathered 3

Sound Lithotypes 56%

Felsic volcanic 22; Felsic intrusive
13; Greywacke 9; Quartz 6; Quartzite
4; Mafic volcanic 3

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
			SEE G7-10

LOCATION #: G7-12

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NTS: 21 G/7

Type of Deposit: Ice-contact

County: Charlotte

Exposure Type: Pit

Parish: Clarendon

Status: Active-on-demand

UTM: 856 282

SECTION DESCRIPTION & COMMENTS:

The main face of the pit was approximately 6 m high at time of visit. An estimated 6,000 m³ of material had been removed for forest road improvement.

The material is typical of esker deposits in the area. It is coarser in the core of the ridge; fine along the flanks. At the site, the overall texture is fine and varies from well sorted medium to coarse sand to well sorted pebble gravel. The maximum clast size observed in section was 20 cm. Pebbles are subrounded to well rounded depending on the hardness of the particular lithotype. The main source for the aggregate was north as indicated by the high proportion of Mississippian volcanic rock types.

Reserves have been calculated for the entire ice-contact system that extends from South Oromocto Lake to Victoria Lake. Variable grades of material are included in the estimate. The best quality of aggregate will be found along the esker ridge. Remaining reserves are very substantial and only a conservative estimated is presented below.

During the summer of 1982, J.D. Irving Ltd. operated the pit and was using the aggregate for road construction.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing		100.0	84.6	69.2	46.1	16.8	3.8	2.0	1.0	0.5

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 44 %

Sandstone 32; Weathered 9; Slate and Shale 3

Sound Lithotypes 56 %

Felsic intrusive 29; Felsic volcanic 13; Quartzite 8; Metasediment 4; Mafic intrusive 1; Quartz 1

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
650	250	3	7.5 million

LOCATION #: G7-13

- 32 -

NTS: 21 G/7

Type of Deposit: Ice-contact

County: Charlotte

Exposure Type: Pit

Parish: Clarendon

Status: Active-on-demand

UTM: 857 264

SECTION DESCRIPTION & COMMENTS:

The pit sections display coarse bouldery sand and gravel. The average face height in the pit is 3 to 4 m (maximum=5 m).

This part of the esker ridge is characterized by very coarse textured material ranging to boulders 1.5 m in diameter. Most of these boulders are of granite, but some sedimentary lithologies have been noted. In general, the boulders are well rounded.

The material has been used for lumber road improvement. Boulders are plentiful and offer a potential source of rip-rap.

MECHANICAL ANALYSIS: N.A.

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing										

LITHOLOGIC ANALYSIS: N.A.

Unsound Lithotypes

3

Sound Lithotypes

3

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
			SEE G7-12

LOCATION #: G7-14

NTS: 21 G/7

Type of Deposit: Ablation till

County: Charlotte

Exposure Type: Roadcut

Parish: Lepreau

Status: Undeveloped

UTM: 922 154

SECTION DESCRIPTION & COMMENTS:

1.0 m+ Silty Gravelly Sand: Poorly-sorted silty and gravelly sand with cobbles and numerous boulders. The sample does not represent material coarser than gravel.

Sampling of the material was done to determine the fine particle content of the till. The ablation till has been used locally as subgrade aggregate for road construction.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing		95.5	86.2	78.2	70.1	63.6	52.1	40.2	28.1	19.1

LITHOLOGIC ANALYSIS:

Unsound Lithotypes

Sound Lithotypes

Predominantly felsic to intermediate intrusives.

ESTIMATION OF RESERVES: N/A

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable

LOCATION #: G7-15

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NTS: 21 G/7

Type of Deposit: Ablation till

County: Charlotte

Exposure Type: Pit

Parish: Clarendon

Status: Inactive

UTM: 782 278

SECTION DESCRIPTION & COMMENTS:

The maximum section height observed is 2.5 m. The material exposed consists of coarse and poorly sorted, moderately compact ablation till. It is sandy and contains a high proportion of coarse angular fragments, up to 0.5 m in diameter. The sample collected from the exposure serves more as an indicator of the percentage of fines in the material than to give an idea of the material present. A distinctive hummocky relief characterizes the deposit.

Material is suitable for borrow and perhaps crushing (with washing). It was used locally as a source of borrow material for local lumber road improvement. Iron cementation of the aggregate was noted in a nearby exposure.

MECHANICAL ANALYSIS:

sieve	31.5mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	79.4	74.2	68.1	57.9	49.3	40.0	33.4	28.1	22.7	17.8	12.4

LITHOLOGIC ANALYSIS: N.A.

Unsound Lithotypes

Sound Lithotypes

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
25	10	2	200,000

LOCATION #: G7-16 NTS: 21 G/7
 Type of Deposit: Ice-contact County: Charlotte
 Exposure Type: Pit Parish: Clarendon
 Status: Active-on-demand UTM: 749 259

SECTION DESCRIPTION & COMMENTS:

A small pit, opened into the flank of an esker ridge, exposed 4 m high slumped faces that showed coarse, crudely bedded, moderately sorted glaciofluvial sand and gravel. The maximum clast size observed in the pit was 60 cm in diameter. Cobbles and small boulders are common in section. One sample was collected to evaluate the proportion of fines in the material.

D.O.T. (1981) tested the material in the vicinity of G7-16. Below is a summary of the results:

Percentage finer than 75 µm: range 2.9% to 6.4%; mean 4.2%
 Los Angeles abrasion loss: 23.0%
 Recommended usage: borrow, subbase

MECHANICAL ANALYSIS:

sieve	31.5mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	78.2	73.7	68.2	50.2	38.0	29.7	21.9	13.9	8.7	6.6	5.6

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	22 %	Sound Lithotypes	78 %
Sandstone 21; Weathered 1		Felsic volcanic 44; Felsic intrusive 22; Quartziet 6; Greywacke 4; Mafic intrusive 1; Metasediment 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
130	65	3	2 million

LOCATION #: G7-17

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NTS: 21 G/7

Type of Deposit: Outwash

County: Charlotte

Exposure Type: Pit

Parish: Clarendon

Status: Active

UTM: 756 235

SECTION DESCRIPTION & COMMENTS:

A high level of activity took place in this pit in 1982. At time of visit, two front-end loaders, several hauling trucks and a crusher/screener were in operation; crushed aggregate was being stockpiled.

Pit faces averaged 2.5 m and the maximum was 5 m. The material exposed consisted of generally well sorted sand and gravel. The bedding was mainly horizontal but some cross-beds were noted. These suggested a paleoflow direction of 160°.

D.O.T. (1981) tested the material at the site. Results are summarized below:

Percentage finer than 75 µm: range 0.9% to 2.9%; mean 1.3%
 Los Angeles abrasion loss: range 21.4% to 26.0%; mean 23.7%
 Recommended usage: borrow, subbase and base (31.5mm crushed)

The material has been used to upgrade the McDougall Lake-Shin Creek Road.

Reserves have been calculated for (1) the glaciofluvial outwash deposit (G7-17) and (2) for the large accumulations of ice-contact sediments extending from north of Seely Lake Road to north of McDougall Lake. Exposures are few throughout this area, thus the reserve figures are evaluated conservatively. In general, more textural variability is to be expected in the ice-contact deposits, greater material uniformity in the outwash.

sieve	31.5mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing ^a			92.8	90.3	88.4	84.7	72.7	35.8	7.6	1.6	0.7
b	92.8	86.9	78.6	62.5	52.3	44.7	33.0	11.1	3.4	1.8	1.3

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 42 %

Sandstone 33; Weathered 5; Slate and Shale 3; Chert 1

Sound Lithotypes 58 %

Felsic intrusive 16; Greywacke 13; Metasediment 10; Quartzite 9; Quartz 5; Felsic volcanic 4; Mafic volcanic 1

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
Outwash 80	15	3	450,000
Ice-contact 1,200	500	3	15 million

LOCATION #: G7-18

NTS: 21 G/7

Type of Deposit: Ice-contact

County: Charlotte

Exposure Type: Pit

Parish: Pennfield

Status: Active-on-demand

UTM: 771 196

SECTION DESCRIPTION & COMMENTS:

Underlying about 0.5 m of overburden- (soil horizon) there is a 1 to 2 m thick unit of poorly stratified cobbly pebble gravel, suggestive of channel facies. An erosional contact separates it from the underlying unit which consists mainly of a well sorted, well bedded sand. The sample was obtained from this unit. Beds of brown silt, silty fine sand and silty pebbly sand diamicton have been noted. Near the base of the section, a well bedded unit of pebbly sand has been observed.

The total height of the main section was 11 m. The coarse upper unit was not sampled. Clasts are generally rounded, resistant and hard, and only a small percentage is larger than cobble-size. The maximum clast diameter observed in pit was 30 cm, however, a few large granite boulder erratics dot the surface of the deposit.

D.O.T. (1981) tested the material at the site and in the vicinity. Results are summarized below:

Percentage finer than 75µm: range 0.9% to 3.5%; mean 1.7%
 Los Angeles abrasion loss: stone 20.3% to 24.3%; mean 22.4%
 Soundness loss: stone 1.30%, 1.00%, 1.44%
 sand 2.44%, 3.20%, 2.13%
 Absorption: stone 1.39%, 1.44%, 1.14%
 sand 1.64%, 0.78%, 1.47%

(CONTINUED)

MECHANICAL ANALYSIS:

N.A.

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing										

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 31 %
 Sandstone 29; Slate 1; Weathered 1

Sound Lithotypes 69 %
 Felsic intrusive 28; Quartzite 15;
 Felsic volcanic 14; Metasediment 5;
 Quartz 2; Sandstone 2; Mafic intrusive
 1; Greywacke 1; Mafic volcanic 1

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
330	200	10	20 million

LOCATION #: G7-18

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(cont'd)

Sand equivalent:

88, 66, 98

Recommended usage:

base, seal and blending sand for asphaltic concrete aggregate; borrow, subbase and base (31.5 mm crushed) aggregate; coarse aggregate for Portland cement.

Although the pit section exposes mainly fine-textured material, coarser aggregate is expected in the core of the esker ridge that flanks the western portion of the kame terrace.

Reserve estimates have been conservatively estimated and apply to that portion of the ice-contact deposit lying south of the Seely Lake Road.

LOCATION #: G7-19

NTS: 21 G/7

Type of Deposit: Ice-contact

County: Charlotte

Exposure Type: Roadcut

Parish: Pennfield

Status: Undeveloped

UTM: 775 192

SECTION DESCRIPTION & COMMENTS:

Various exposures along a steep hill were examined. The total height of the section is 12 m. Only the lower 6 m were exposed along the road.

In general, the material grades from coarse-grained sand to poorly-sorted sand and gravel with cobbles (from top to bottom). Approximately 30% of the material is gravel and coarser. Clasts are subrounded to subangular in shape. The aggregate is quite silty near the base of the section. The sample was obtained from the upper 2 m.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	100.0	99.4	98.4	97.3	94.8	84.4	21.4	2.3	1.0	0.7

LITHOLOGIC ANALYSIS: N.A.

Unsound Lithotypes	%	Sound Lithotypes	%
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ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
			SEE G7-18

LOCATION #: G7-20

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NTS: 21 G/7

Type of Deposit: Ice-contact

County: Charlotte

Exposure Type: Roadcut

Parish: Pennfield

Status: Undeveloped

UTM: 778 189

SECTION DESCRIPTION & COMMENTS:

0.8 m Sand: Fine and medium-grained sand. This unit appears massive. The upper part is oxidized and weathered (silty). The sample was obtained from this unit.

0.8 m Sand: Predominantly fine-grained sand, slightly silty near the base.

This portion of the deposit could be used as fine blending sand, however, the granulometry is variable and the percentage of silt is high.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing				100.0	98.9	97.1	85.1	55.9	24.4	7.9

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	%	Sound Lithotypes	%
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ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
			SEE G7-18

LOCATION #: G7-21

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NTS: 21 G/7

Type of Deposit: Ice-contact

County: Charlotte

Exposure Type: Roadcut

Parish: Pennfield

Status: Undeveloped

UTM: 781 189

SECTION DESCRIPTION & COMMENTS:

7.0 m Sand and Gravel: Predominantly coarse-grained sand and fine to coarse-grained gravel with some cobbles and a few boulders. The sample was obtained from this unit.

At the base of the section, the material appears till-like and contains angular pebbles and cobbles in a silty sand matrix.

MECHANICAL ANALYSIS:

sieve	31.5mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	100.0	93.1	91.6	82.5	67.8	51.2	36.2	10.5	1.4	0.4	0.3

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 22 %

Sandstone 15; Weathered 5; Shale 2

Sound Lithotypes 78 %

Felsic intrusive 29; Acid to Intermediate volcanic 26; Quartz and quartzite 23

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
			SEE G7-13

LOCATION #: G7-22

- 42 -

NTS: 21 G/7

Type of Deposit: Outwash

County: Charlotte

Exposure Type: Roadcut-Pit

Parish: Pennfield

Status: Undeveloped

UTM: 765 171

SECTION DESCRIPTION & COMMENTS:

3.0 m Cobbly Sand and Gravel: Predominantly coarse-grained sand and fine to coarse-grained gravel with numerous cobbles. Clasts are as large as 2.5 cm in diameter and are predominantly sub-rounded in shape. Sample (a) was obtained from this unit.

1.5 m Gravelly Sand to Sand: Coarse-grained sand with fine-grained gravel grading to fine-grained sand with depth.

1.0 m Sand: Fine-grained sand with some silty fine-grained sand layers. Appears weakly stratified.

Sample (b) was obtained approximately 25 m south of the small pit. This portion of the deposit may be a useful source of fine blending sand.

MECHANICAL ANALYSIS:

sieve	31.5mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing ^a	82.5	62.1	52.6	42.1	32.9	24.1	17.7	7.5	2.1	1.0	0.6
b			100.0	99.8	99.6	99.3	99.0	94.3	78.1	41.0	7.3

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 22%

Sandstone 18; Shale 2; Schist 1;
Chert 1

Sound Lithotypes 78%

Felsic to intermediate volcanic 37;
Quartz and quartzite 26; Felsic
intrusive 23; Mafic volcanic 2

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
			SEE G7-23

LOCATION #: G7-23

- 43 -

NTS: 21 G/7

Type of Deposit: Outwash

County: Charlotte

Exposure Type: Pit

Parish: Pennfield

Status: Active-on-demand

UTM: 762 169

SECTION DESCRIPTION & COMMENTS:

The average section height at time of visit was 6 m but only the upper two metres were well exposed. The material consisted of horizontally bedded, well sorted, stratified sand beds, coarse cobbly gravel and sandy pebble gravel beds. The texture is uniform. There is a high percentage of hard lithotypes. Some boulders are present within the deposit.

The material has good crushing potential and remaining reserves are very substantial.

D.O.T. (1981) tested the material at the site. Results are summarized below:

Percentage finer than 75µm: range 0.7% to 3.3%; mean 1.4%
 Los Angeles abrasion loss: range 22.9% to 24.3%; mean 23.6%
 Recommended usage: borrow, subbase, base (31.5 mm crushed)

In 1981, Opron Maritimes Construction Ltd. removed about 15,000 tonnes of gravel for foundation backfill at the Mt. Pleasant mine site.

Large reserves are present within the valley train, south of McDougall Lake. The reserve figure is based on available field exposures. It should be interpreted as a conservative estimate. Additional subsurface data may increase reserve volumes significantly. Geological evidence suggests that the deposit may attain a thickness in excess of 20 m in places, especially near the southern extremity.

MECHANICAL ANALYSIS:

sieve	31.5mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	89.1	79.4	75.7	64.4	54.2	43.1	29.5	11.3	2.4	1.1	0.9

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 41 %

Sandstone 35; Slate and Shale 3;
 Weathered 3

Sound Lithotypes 59 %

Felsic intrusive 18; Felsic volcanic
 14; Greywacke 11; Quartzite 9; Mafic
 volcanic 3; Quartz; Mafic intrusive 1

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
1,100	570	4	23 million

LOCATION #: G7-24

- 44 -

NTS: 21 G/7

Type of Deposit: Outwash

County: Charlotte

Exposure Type: Roadcut

Parish: Pennfield

Status: Undeveloped

UTM: 765 167

SECTION DESCRIPTION & COMMENTS:

0.6 m Sand and Gravel: Oxidized and weathered silty sand and gravel.1.2 m Cobbly Sand and Gravel: Predominantly coarse-grained sand and fine to coarse-grained gravel with cobbles. Clasts are predominantly subrounded in shape. The sample was obtained from this unit.0.3 m Sand: Predominantly fine-grained sand.0.3 m Cobbly Sand: Fine-grained sand with numerous cobbles and some gravel.

MECHANICAL ANALYSIS:

sieve	31.5mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	91.3	80.9	75.7	65.8	57.6	48.3	37.8	13.9	3.5	1.7	1.2

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	28	%
--------------------	----	---

Sandstone 21; Schist 3; Weathered 3;
Shale 1

Sound Lithotypes	72	%
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Felsic and intermediate volcanic 29;
Quartz and quartzite 25; Felsic
intrusive 16; Mafic volcanic 2

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
			SEE G7-23

NTS: 21 G/7

County: Charlotte

Parish: Pennfield

UTM: 776 166

SECTION DESCRIPTION & COMMENTS:

0.5 m Overburden: Soil horizon.

2.0 m Sand and Gravel: Stratified sand, silty sand and fine pebble gravel. Sample A was obtained from a gravelly horizon; Sample B represents a sandy horizon. The sand horizons are finely bedded and include layers of silt and silty sand. The material is vertically and laterally variable but generally fine-textured. Sand dominates the exposures in the pit.

The pit is small and the workings shallow. The largest clast observed measured 20 cm. The pebbles are generally well rounded and the material is moderately well sorted. Slumping of the beds and disturbed stratification indicated an ice-contact environment of disposition. A coarse bouldery ablation till blankets the terrian in the general area.

The material is suitable as a source of fill. Parts of the deposit have supplied winter sand to the lumber industry.

D.O.T. tested the material at, and in the vicinity of G7-25, and about 1.5 km west, in the valley outwash deposit. Results are summarized below:

MECHANICAL ANALYSIS:

sieve	31.5mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	96.9	95.3	91.3	70.3	50.6	35.4	25.6	20.6	18.9	16.5	12.2
			100.0	97.2	91.3	87.0	81.1	65.6	36.9	11.8	3.9

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	Sound Lithotypes

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
			SEE G7-18

LOCATION #: G7-25

- 46 -
(cont'd)

For the Ice-contact Material:

Percentage finer than 75 μ m:	range 1.3% to 6.6%; mean 2.0%
Los Angeles abrasion loss:	range 23.3% to 26.8%; mean 25.3%
Soundness loss:	stone 1.31%; sand 1.90%
Absorption:	stone 1.29%; sand 1.79%
Sand Equivalent:	85
Recommended Usage:	base (31.5 mm crushed), base and seal asphaltic concrete aggregate, 19 and 12.5 mm chips for surface treatment, borrow and subbase.

For the Outwash Material:

Percentage finer than 75 μ m:	range 1.0% to 2.1%; mean 1.3%
Los Angeles abrasion loss:	range 20.1% to 23.3%; mean 21.8%
Recommended usage:	borrow, subbase and base (31.5 mm crushed)

The results highlight the greater degree of maturity of the glaciofluvial outwash deposit relative to the ice-contact material.

LOCATION #:	G7-26	NTS:	21 G/7
Type of Deposit:	Outwash	County:	Charlotte
Exposure Type:	Roadcut	Parish:	Pennfield
Status:	Undeveloped	UTM:	763 160

SECTION DESCRIPTION & COMMENTS:

0.6 m Cobbly Sand and Gravel: Predominantly coarse-grained sand and fine to coarse-grained gravel with cobbles. Approximately 50% sand by volume. The sample was obtained from this unit.

MECHANICAL ANALYSIS:

sieve	31.5mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	87.1	62.4	57.7	45.8	39.1	34.3	28.9	12.0	2.0	0.6	0.4

LITHOLOGIC ANALYSIS: N.A.

<u>Unsound Lithotypes</u>	<u>%</u>	<u>Sound Lithotypes</u>	<u>%</u>
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ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
			SEE G7-23

LOCATION #: G7-27

- 48 -

NTS: 21 G/7

Type of Deposit: Ice-contact

County: Charlotte

Exposure Type: Pit

Parish: Pennfield

Status: Inactive

UTM: 751 146

SECTION DESCRIPTION & COMMENTS:

West Section

One to 2 m of well sorted, well bedded, fine to medium sand and some pebbly sand beds, overlying massive, brown silty sand.

North Section

About 14 m of well bedded and stratified coarse sand to cobbly pebble gravel. Clasts are subrounded to rounded. Beds dip steeply to the west. Some horizons of clast-supported gravel near the core.

Northeast Section

This exposure shows sand and pebbly gravel beds overlying hard dense brown sandy silt to clayey silt.

The deposit exhibits considerable textural variability, both laterally and vertically. Where present, coarse aggregate is generally well bedded and well sorted, and probably suitable for crushing. The coarser material appears, however, to be restricted to the core of the deposit.

Significant volumes of clayey silt and sandy silt drape the flanks of the esker

MECHANICAL ANALYSIS:

(CONTINUED)

sieve	31.5mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	93.9	90.5	85.9	70.0	53.3	20.7	12.6	4.4	2.0	1.4	1.1

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 34 %

Sandstone 32; Weathered 2

Sound Lithotypes 66 %

Felsic intrusive 20; Quartzite 14;
Greywacke 12; Metasediment 8; Felsic
volcanic 7; Quartz 4; Conglomerate 1

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
85	11	10	1 million

LOCATION #: G7-27

- 49 -
(cont'd)

ridge.

D.O.T. (1980) tested the material at the site. Below is a summary of the results:

Percentage finer than 75 μ m:	range 0.8% to 1.8%
Los Angeles abrasion loss:	23.4% to 24.8%
Soundness loss:	stone 2.24%; sand 2.73%
Absorption:	stone 1.24%; sand 1.64%
Sand equivalent:	85
Recommended usage:	asphaltic concrete-base and seal aggregate

Reserve estimates apply to the main esker ridge only. Substantial, but more shallow accumulations of probably sandy material surrounding the ice-contact ridge may add other million m^3 of aggregate to the calculated reserves.

LOCATION #: G7-28

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NTS: 21 G/7

Type of Deposit: Outwash

County: Charlotte

Exposure Type: Pit

Parish: St. George

Status: Inactive

UTM: 745 131

SECTION DESCRIPTION & COMMENTS:

1.0 m Overburden: Poorly sorted sandy horizon, including pebbly zones, resting unconformably over the main body of the section. Possibly represents slopewash.

1.0 m Sand: Well sorted, well bedded, medium to fine sand with occasional pebbles. Sample (a) was obtained from this horizon.

6.0 m Slump Covered: Assumed to be as above.

The material exposed in the pit is fine-textured. Finamore (1977) commented that it was too fine to satisfy fine concrete aggregate specifications. Coarser material is expected in the core of the deposit, away from the periphery.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing				100.0	99.8	95.7	55.6	16.9	3.0	0.9

LITHOLOGIC ANALYSIS: N.A.

Unsound Lithotypes 3

Sound Lithotypes 3

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
60	40	3	1.2 million

LOCATION #: G7-29

- 51 -

NTS: 21 G/7

Type of Deposit: Outwash

County: Charlotte

Exposure Type: Pit

Parish: St. George

Status: Inactive

UTM: 719 151

SECTION DESCRIPTION & COMMENTS:0.4 m Overburden: Sandy loam, deeply oxidized.0.6 m Sand: Well sorted, orange brown, medium to coarse sand.1.2 m Silt: Compact and dense, brown clayey silt grading into laminated silt at the base; probably marine.0.4 m Sand: White, well-bedded, well-sorted fine sand.0.2 m Sand: Moderately well-sorted, coarse, white granitic sand; angular sand grains and occasional rounded granite pebble; loose structure.0.2 m Slump Covered: Assumed to be above.

This section suggests three phases of deposition: (1) glaciofluvial outwash at base consisting of locally derived material; (2) fine silt and clay deposited in a marine transgression following deglaciation; and (3) alluviation following regression of marine waters.

Calculated reserves refer to the potential of the alluvial deposits mapped in the vicinity of Lee Settlement. Within the area subjected to the marine transgression (see map in pocket), patches of sand are expected to be common but generally of local interest only, as is the case with G7-29.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing		100.0	95.6	82.0	61.6	36.9	16.1	5.5	1.5	0.3

LITHOLOGIC ANALYSIS: N.A.

Unsound Lithotypes

Sound Lithotypes

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
155	20	3	600,000

LOCATION #: G7-30

- 52 -

NTS: 21 G/7

Type of Deposit: Ice-contact

County: Charlotte

Exposure Type: Pits

Parish: St. George

Status: Abandoned

UTM: 683 163

SECTION DESCRIPTION & COMMENTS:

Two linear pits, up to 4 m deep, expose fine-textured material. The east face of the south pit consisted of well sorted, loose, medium sand (see sample "a" below). The west face was about 2 m high and displayed fine sand over sandy silt, silt and clayey silt.

The southwest corner of the map-area, including location G7-30, is thought to have been affected by a post-glacial marine transgression and consequent alluvial events as emergence proceeded. Fine sediments (silts and clays) found below 60 m elevation support the concept of marine inundation. Abandoned channels and scattered patches of sand and gravel are evidence for an ancient and more active phase of alluviation.

Thin and patchy deposits of granular material occur frequently over the general area. Because of the limited volumes present in any one locality, use of the material has been restricted to local needs. On the aggregate map, arrows indicate the presence of former fluvial channels and point to areas where the potential of locating small sources of granular aggregate is the greatest.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing				100.0	99.8	99.2	89.1	31.6	6.1	1.2

LITHOLOGIC ANALYSIS: N.A.

Unsound Lithotypes	%	Sound Lithotypes	%

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
			Limited

LOCATION #: G7-31

NTS: 21 G/7

Type of Deposit: Ice-contact

County: Charlotte

Exposure Type: Pit

Parish: St. Patrick

Status: Active-on-demand

UTM: 572 129

SECTION DESCRIPTION & COMMENTS:

The material is well bedded and well sorted throughout and face heights average 15 m. A few boulders were noticed (average diameter of 1 m) at the base of the talus and on top of the deposit. In general, the texture grades from medium sand to pebble gravel. Some strata are clast supported and others have a significant sand matrix. An upper metre of sandy diamicton was noted at the top of the section.

D.O.T. (1971) tested the material and results are as follows:

Percentage finer than 75µm: range 1.5% to 4.0%; mean 1.9%

Los Angeles Abrasion Loss: 22.1%, 22.3%, and 22.9%

Recommended Usage: borrow, subbase, base course aggregate, winter sand and filter material.

The deposit extends into map-area 21 G/6 (Rollingdam) where an estimated additional 100,000 m³ of material can be found.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
a passing	97.6	93.5	81.2	66.5	48.3	34.1	12.7	4.1	1.6	0.8
b	100.0	99.5	97.7	95.2	91.4	85.3	59.5	24.7	6.9	2.0

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 35 %
 Sandstone 16; Slate 10; Weathered 4;
 Chert 3; Siltstone 2

Sound Lithotypes 65 %
 Sandstone 25; Argillite 15;
 Quartzite 12; Metasediment 7;
 Quartz 4; Mafic intrusive 1; Mafic volcanic 1

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
15	5	10	500,000

APPENDIX B

SUPPLEMENTARY
FIELD OBSERVATIONS

- 118 UTM 593 313
Inactive pit. Faces are 2 to 3 m high. Subdued portion of esker. Glaciofluvial sand and gravel. Clasts subrounded to rounded. High proportion of red siltstone, sandstone, and conglomerate. Material used locally as road fill.
- 129 UTM 626 397
Small abandoned roadside pit. Maximum section height of 2 m. Sandy ablation till with boulders up to 1.0 m in diameter. Small moraine.
- 130 UTM 628 385
Small pit. Loose sandy ablation till with some boulders. High proportion of poor lithotypes.
- 131 UTM 625 381
Small abandoned shallow roadside pit. Moderately compact silty stony sand till. Medium size boulders are common.
- 132 UTM 632 354
Shallow abandoned pit. Maximum section height of 2 m. Abundance of angular clasts from Silurian-Lower Devonian terrane indicate proximity of bedrock. Occasional boulder. Sandy stony till.
- 143 UTM 734 386
Abandoned borrow pit. Maximum face height of 2 m. Coarse-textured sandy ablation till.
- 152 UTM 820 330
Small pit developed into a minor esker. The material consists of sand and gravel with very large boulders of Silurian sedimentary rock.
- 153 UTM 828 345
Two small roadside pits, active-on-demand. Fill grade material only. Moderately loose, grey-brown, silty till. Fragments angular to sub-angular. Maybe colluvial in part.
- 154 UTM 839 345
Small roadside pit. Maximum face height of 2.5 m. Sections displayed very poorly sorted sandy till with large clasts (up to 1 m). The till is moderately loose to compact. Small moraine. Used locally as borrow for lumber roads.
- 167 UTM 754 255
Abandoned pit opened in a low, 4 to 5 m high ice-contact mound. Material consists of poorly sorted, stratified sand and gravel. Maximum clast size in section was 40 cm. The material was used locally as road fill.

173b UTM 819 285

Excavation on hill side. Stony sand and moderately compact till overlying Silurian bedrock.

173c UTM 827 288

Hillside excavation to Silurian sedimentary bedrock. Red till associated with sand.

176 UTM 855 285

A small abandoned pit. Maximum face height of 4 m. Pebble gravel in the core, sand on the flanks. Small appendage to the main esker body.

181 UTM 934 222

Shallow roadside pit. Crudely sorted material, cobbly and bouldery sand. Roadcuts in the vicinity expose up to 3 m of crudely sorted, coarse glaciofluvial material. Such local and scattered accumulations of material appear to be common in the upper reaches of the Lepreau River.

184 UTM 780 264

Small borrow pit. Till.

189 UTM 777 175

Small roadside pit. The material exposed consisted of well-sorted, medium to coarse sand, relatively pebble-free. The ground surface is flat to gently undulating.

191 UTM 779 165

Inactive pit. Maximum face height of 4 m. Coarse, cobbly gravel, well-rounded clasts and fair sorting. Good crushing potential. Ice-contact stratified deposit.

194 UTM 750 169

Small pit. The material exposed consists of moderately well-sorted glaciofluvial sediments, from loose, coarse sand to pebble gravel. A few large boulders are incorporated in the section. Boulders are common features of the landscape; the ground is hummocky and the depressions are filled with over 1 m of peat.

195 UTM 739 169

Abandoned pit. Maximum face height of 3 m. Sandy glaciofluvial outwash material.

198 UTM 765 200

Abandoned pit. Ice-contact glaciofluvial sand and gravel. Fine-textured material dominates.

201

UTM 754 252

Inactive roadside pit opened in an ice-contact mound. Maximum face height of 6 m. Material is moderately sorted, generally fine-textured, with cobble size clasts distributed throughout. Occasional small boulders.

204

UTM 636 275

Small abandoned roadside pit. Maximum pit faces of 4.5 m. Glaciofluvial material is exposed. From coarse, well-sorted sand to moderately sorted, sandy, pebble gravel. Abundance of poor Silurian sedimentary lithotypes. Maximum clast size = 40 cm (granite boulder).

205

UTM 639 271

Small and shallow pit. Maximum face height of 2 m. The material displayed consisted of moderately, well-sorted, sandy, pebble gravel and sand overlying reddish brown sand, silty sand and silt at the base.

206

UTM 658 242

Small abandoned pit. Maximum face height of 2.5 m. Sections displayed about 2 m of loose, moderately sorted, sand and fine to medium pebble gravel. Augering at the base of the pit showed 50 cm+ of reddish brown sand and silty sand.

Testing by D.O.T. (1966) along Route 770, 1.5 km north of location 206, indicated a similar stratigraphy: about 1 to 2 m of sand, underlain by clay.

207

UTM 685 197

Small abandoned pit opened in a morainic deposit. Maximum face height of 6 m. Sections displayed coarse, moderately sorted sand with abundant angular granite fragments, varying from pebbles to boulders. Stony sand till.

Testing by D.O.T. (1979) in the vicinity indicated the presence of about 2 m of dirty sandy medium gravel underlain by silt. In two test pits, the water table was encountered at about 1 m depth. In four other test pits, it was impossible to dig deeper than 1 m because of the presence of large boulders.

209

UTM 631 138

Small inactive roadside pit. The material exposed consisted of well-sorted, fine to medium sand with large granite boulders. Possible wave-reworked morainic deposit.

213

UTM 812 217

Small abandoned pit. Coarse, sandy ablation moraine. Abundant small granite boulders and cobbles. Local relief is 6 m.

214

UTM 688 343

Small active-on-demand pit; reserved depleted. Maximum face height of 3 m. Small arcuate ice-contact ridge. Material varies texturally from poorly sorted sand and pebble gravel to hard and compact medium sand. Silt is also present. The material was used as fill.

217

UTM 683 336

Small abandoned pit. Maximum face height of 3 m. Material consists of very poorly sorted, pebbly sand, moderately compact in places. A few small boulders at the surface.

218

UTM 627 291

Small abandoned pit opened in a segment of the Magagaudavic esker system. Faces were between 6 and 7 m high. The sections were badly slumped; the material is fine-textured. Estimated reserves for the Magaguadavic esker system are about 1 million m³.

219

UTM 637 283

Small abandoned and shallow pit. The material exposed consisted mainly of sand; it was used as road fill for a lumber road that crosses an abandoned and marshy alluvial channel.

227

UTM 606 301

Not visited by author. Material was removed by D.O.T. for up-grading of Highway 770 and in October 1982, two trucks were hauling material to microwave tower at Pleasant Ridge (P. O'Leary, Department of Natural Resources, written communication). Probably of ice-contact origin and related to the Magaguadavic esker system.

228

UTM 917 216

A quarry permit was issued in 1982 to A.C. Landry and Sons Ltd., of Caraquet, to remove 5,000 tonnes of boulders for use as armor stone in coastal engineering work. Granite boulders are plentiful in the general area.



PROVINCE DU NOUVEAU-BRUNSWICK
MINISTÈRE DES RESSOURCES NATURELLES
DIRECTION DE L'EXPLOITATION MINIERE

PLANCHE 83-30

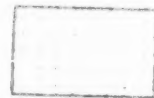
RESSOURCES EN AGREGAT GRANULAIRE

de
McDOUGALL LAKE

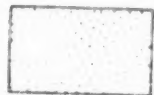
21 G/7

DEPOTS

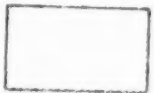
Alluvion (sable, sable et gravier, parfois limoneux)



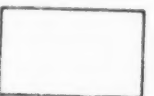
Epandage fluvio-glaciaire (sable et gravier)



Sédiments de contact glaciaire (sable et gravier, ordinairement stratifiés, peut inclure des galets, des blocs ainsi que des quantités variables de limon ou d'argile)



Till d'ablation (ensemble plus ou moins compact de blocs, cailloux, sables, limon et argile en proportions variables; peut parfois inclure des zones de sables et graviers triés)



PROVINCE OF NEW BRUNSWICK
DEPARTMENT OF NATURAL RESOURCES
MINERAL DEVELOPMENT BRANCH

PLATE 83-30

GRANULAR AGGREGATE RESOURCES

of
McDOUGALL LAKE

21 G/7

DEPOSITS

Alluvium (sand, sand and gravel, at times silty)

Glaciofluvial outwash (sand and gravel)

Ice-contact stratified drift (sand and gravel, usually stratified; may contain cobbles, boulders and varying amounts of silt and/or clay)

Ablation till (poorly to moderately compacted agglomeration of boulders, pebbles, sand, silt, and clay in varying proportions, may locally include pockets of sorted sand and gravel)

21 G/7

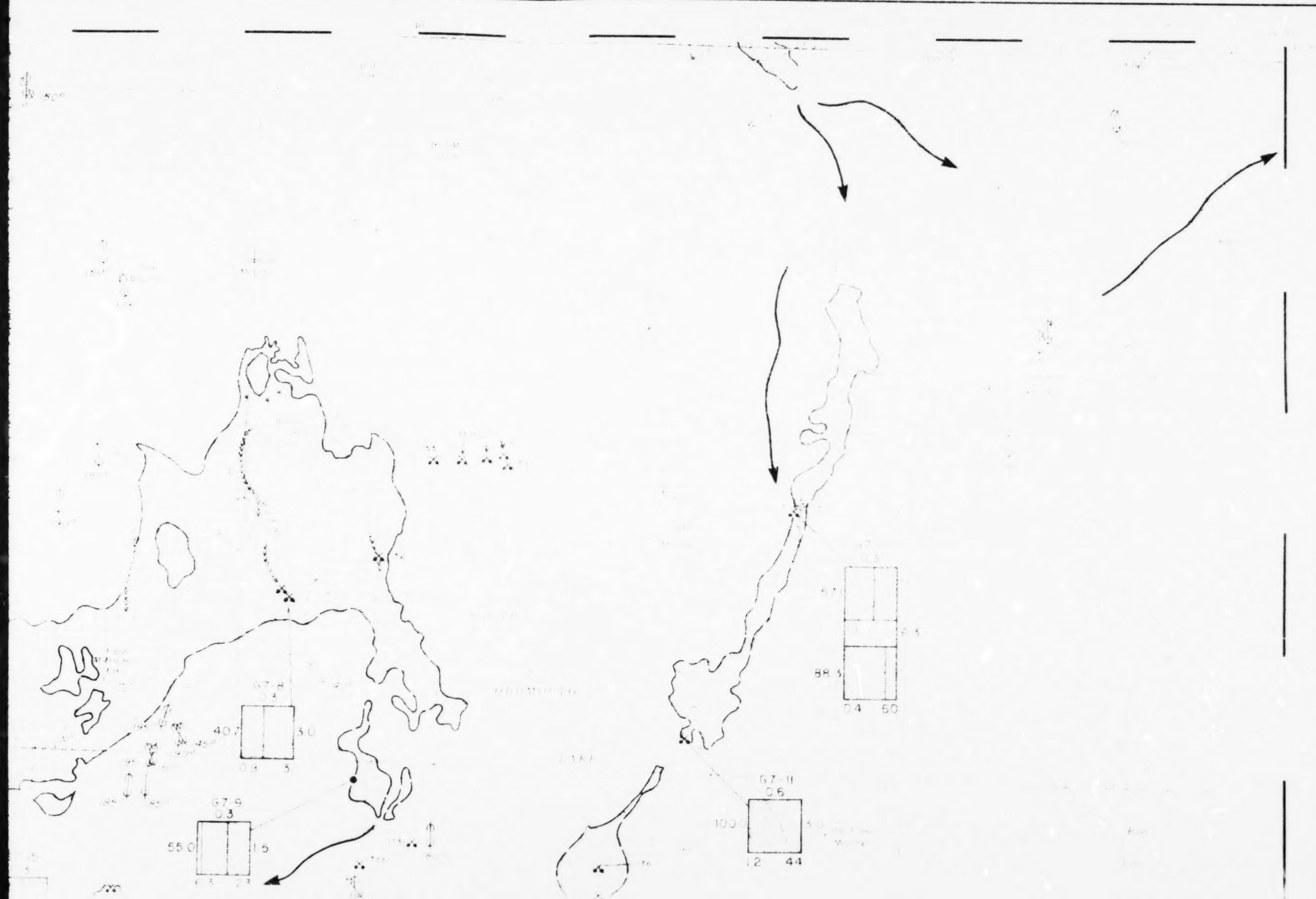


1:50,000

METRIC

CANADA





ordinairement stratifiés, peut inclure des galets, des blocs ainsi que des quantités variables de limon ou d'argile)



stratified, may contain cobbles, boulders and varying amounts of silt and/or clay)

Till d'ablation (ensemble plus ou moins compact de blocs, cailloux, sables, limon et argile en proportions variables; peut parfois inclure des zones de sables et graviers triés)



Ablation till (poorly to moderately compacted agglomeration of boulders, pebbles, sand, silt, and clay in varying proportions, may locally include pockets of sorted sand and gravel)

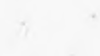
SYMBOLES

Pourtour géologique (déterminé, approximatif, déduit)



Geological boundary (defined, approximate, inferred)

Stries glaciaires (sens de l'écoulement connu, inconnu, azimut du relèvement en degrés)



Glacial striae (direction of ice movement known, unknown, azimuth of bearings in degrees)

Dallage de blocs



Boulder pavement

Chenal alluvial ou de fonte glaciaire (avec la direction de l'écoulement)



Alluvial or glacial drainage channel (with flow direction)

Drumlin ou surface fuselée



Drumlin or fluted surface

Gravière



Gravel pit

Esker (direction de l'écoulement connue ou présumée)



Esker (direction of flow known or assumed)

Site d'échantillonnage (autre que gravière)



Sample location (other than gravel pit)

Numéro d'identification du site

67-75

Sample location number

Site d'observation supplémentaire

INT

Supplementary observation site

Non disponible

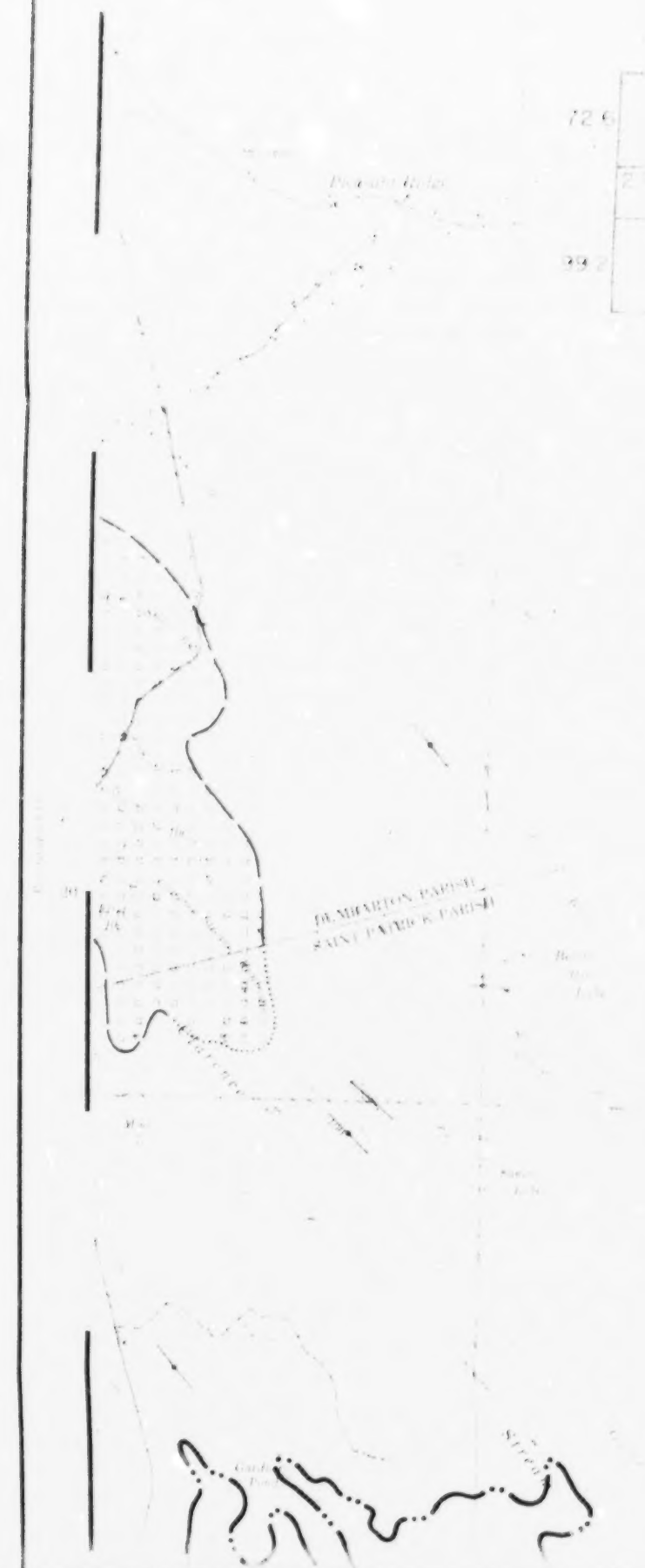
N.A

Not available

Limite probable de submersion marine



Probable limit of marine submergence

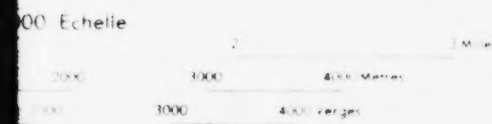








McDOUGALL LAKE NEW SWICK



CONTOUR INTERVAL 10 METRES
Elevations in Metres above Mean Sea Level

EQUIDISTANCE DES COURBES 10 METRES
Altitudes en metres

McDOUGALL LAKE
21G/7
EDITION 2

POOR

QUALITY

ORIGINAL

